

ARCLETS for WFIRST

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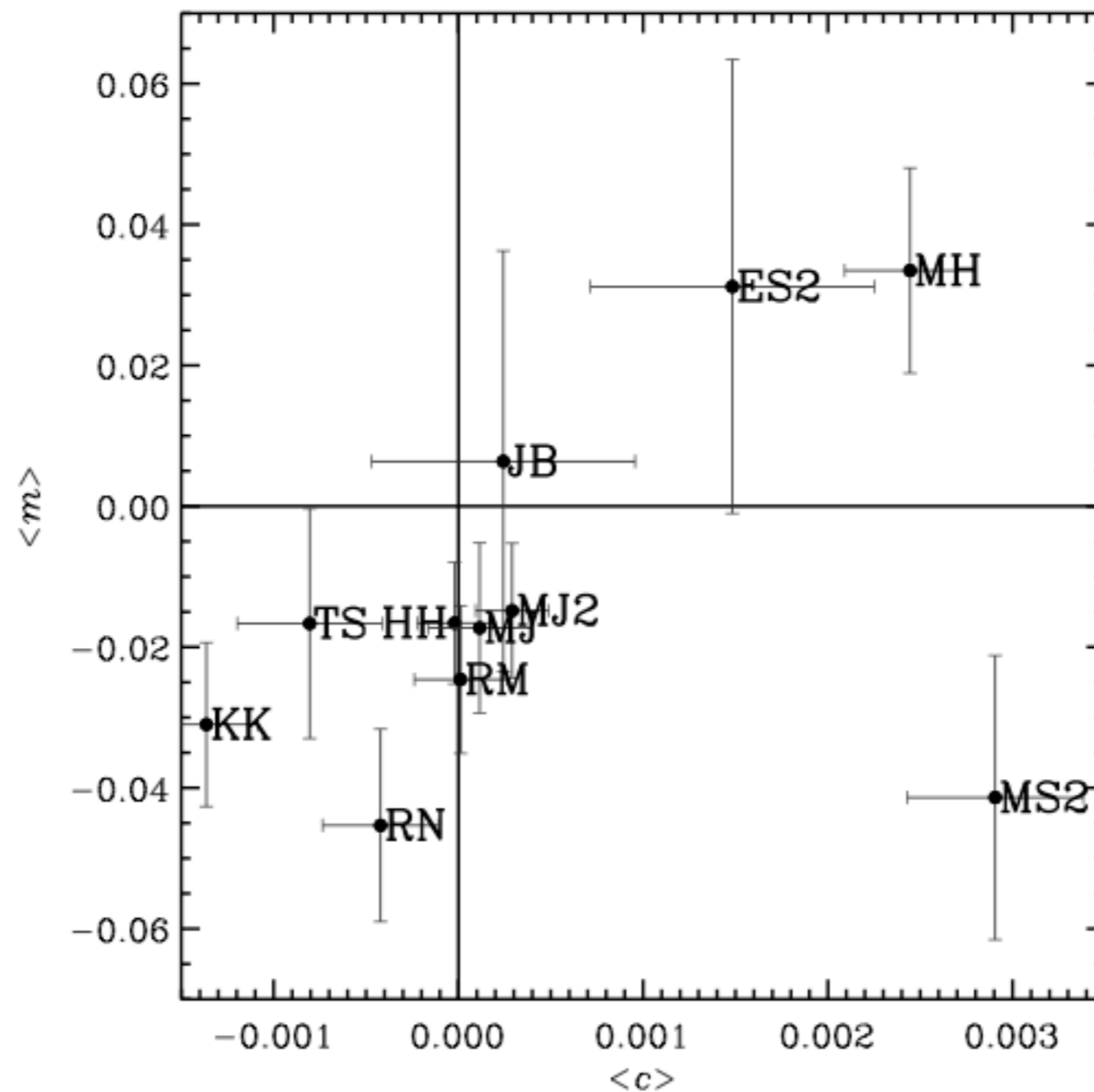
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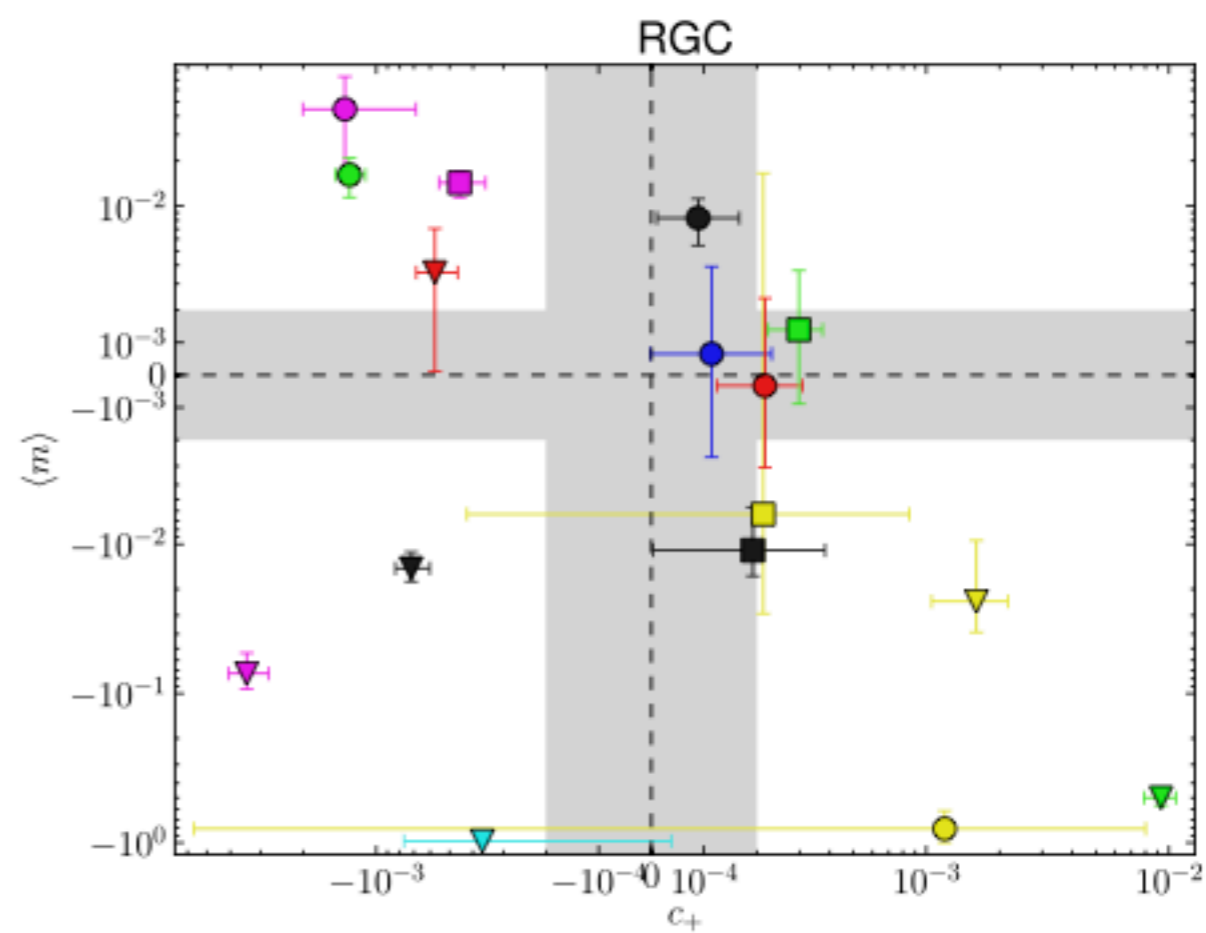
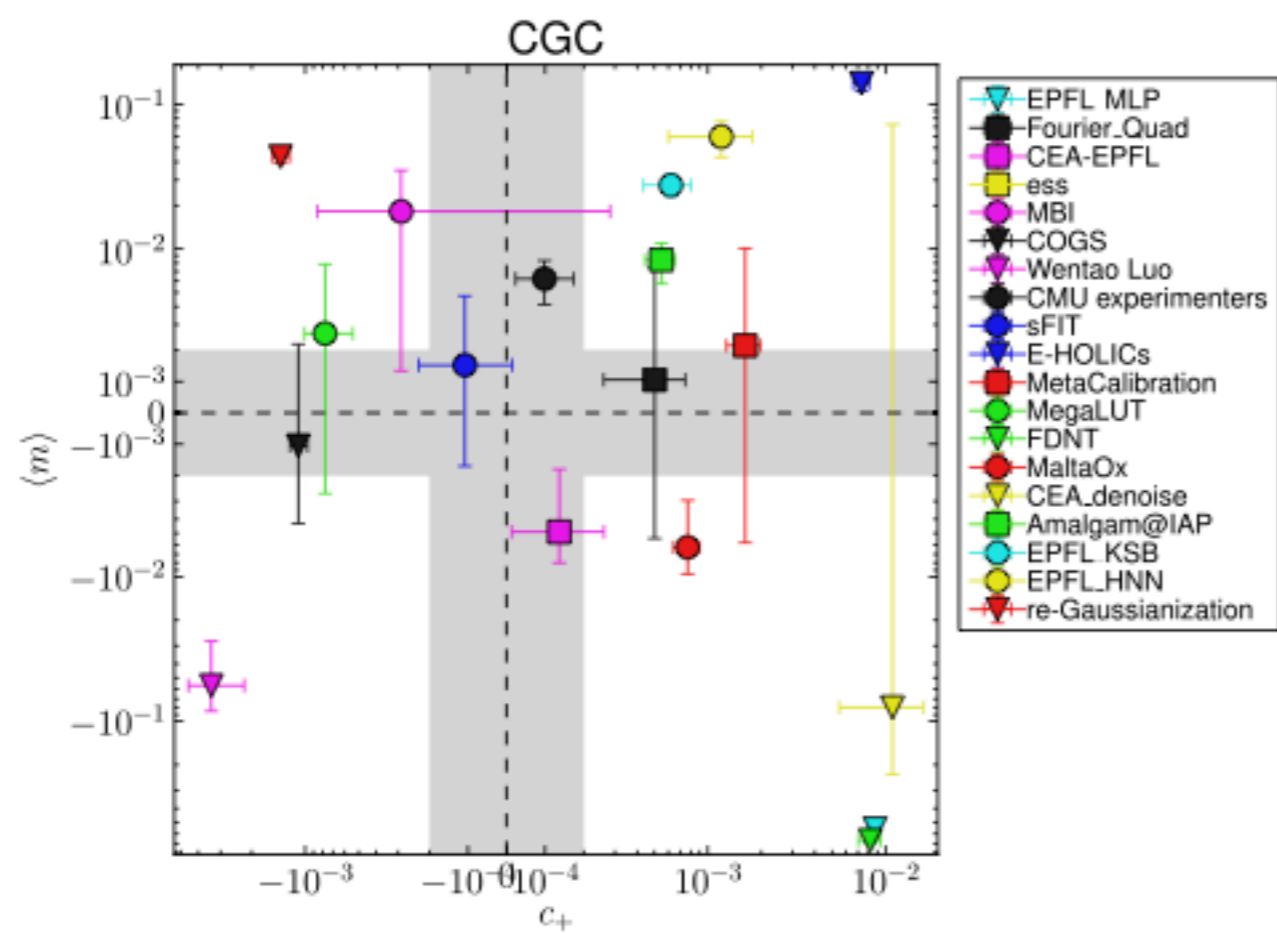
Shear Calibration

- ✦ To get forecast cosmological constraints from future observatories, shear must be unbiased at a level of $<0.1\%$ (cosmic shear) or $<1\%$ (clusters)

STEP 2 (2006)



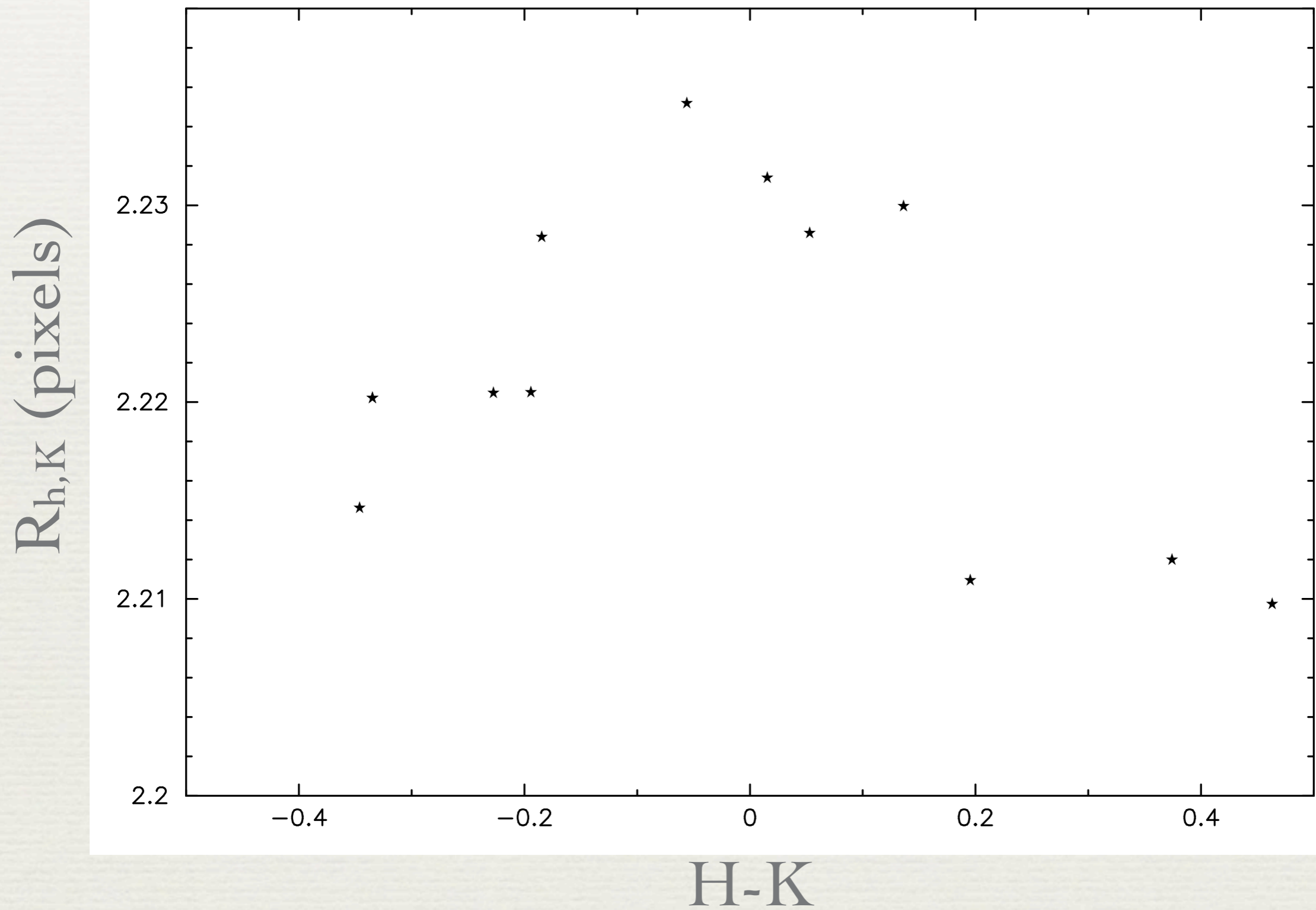
GREAT3 (2015)



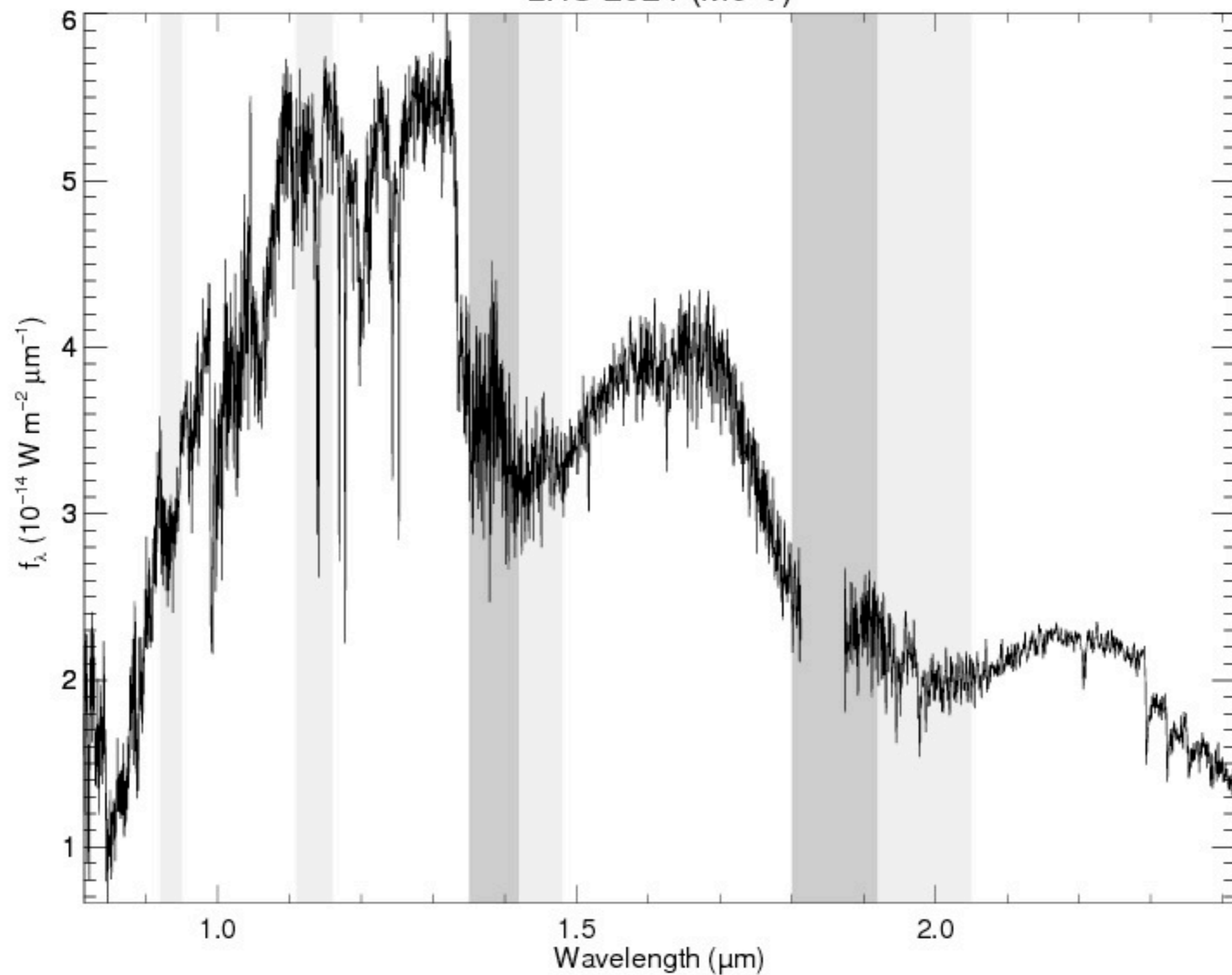
Limitations of current simulations

- ✦ Low shear levels ($<.05$ or $.1$)
- ✦ Constant, linear shear applied across galaxies
- ✦ Monochromatic galaxies

PSF size vs color



LHS 2924 (M9 V)

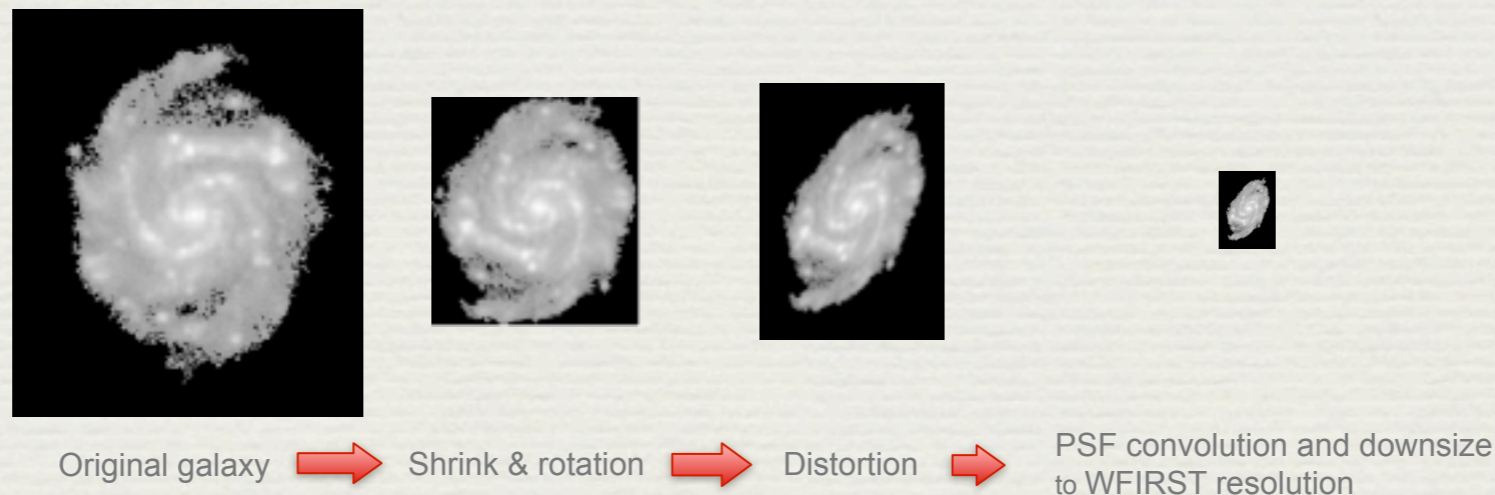


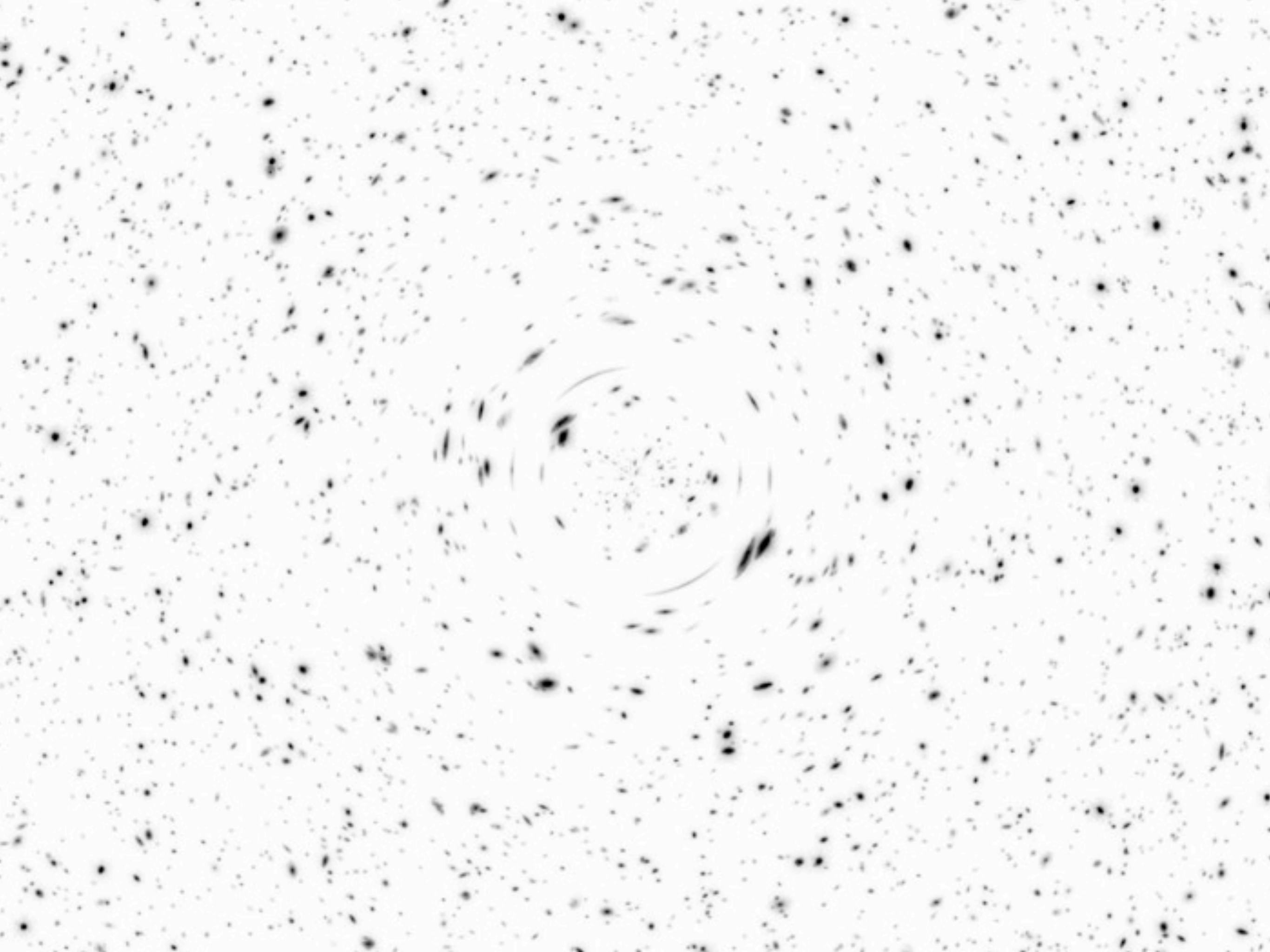
WFIRST PSF correction

- ✦ Space-based PSF size is a strong function of observed wavelength
- ✦ Details of the object SED are important
- ✦ Will need to model PSF data cube based on shapes and SEDs of stars in the field
- ✦ Use photo-zs of WFIRST+LSST photometry to estimate SED of galaxy
- ✦ create PSF for galaxy based on image location, SED

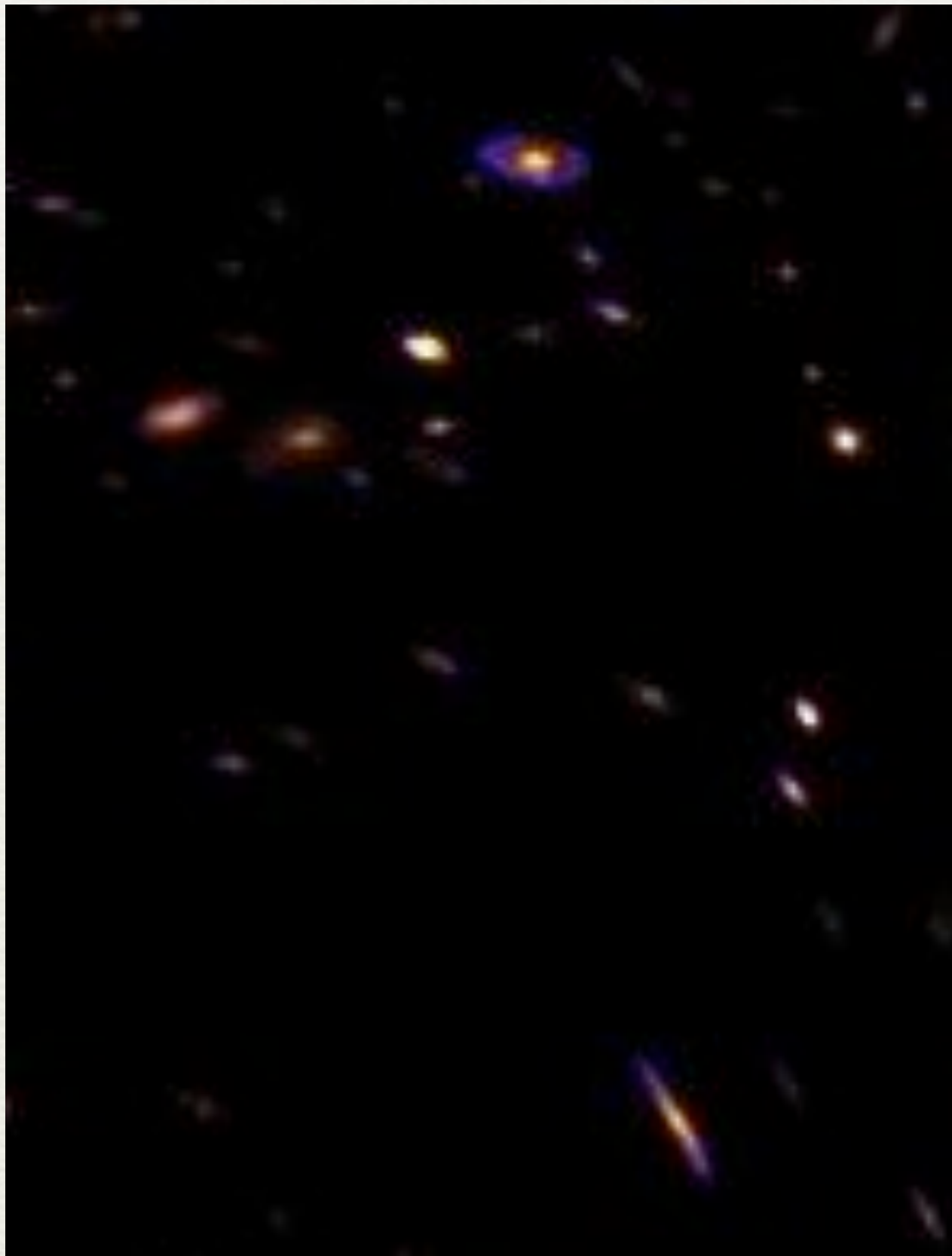
ARCLETS

- ✦ Cluster based shear simulations using subpixel deflection to include higher order lensing effects
- ✦ Made with bright HST galaxies, which are shrunk, rotated, scaled in brightness, deflected, and convolved
- ✦ Chromatic effects added by interpolating between HST passbands (F606, 814, 125), averaging ~ 20 narrow bands per broadband image

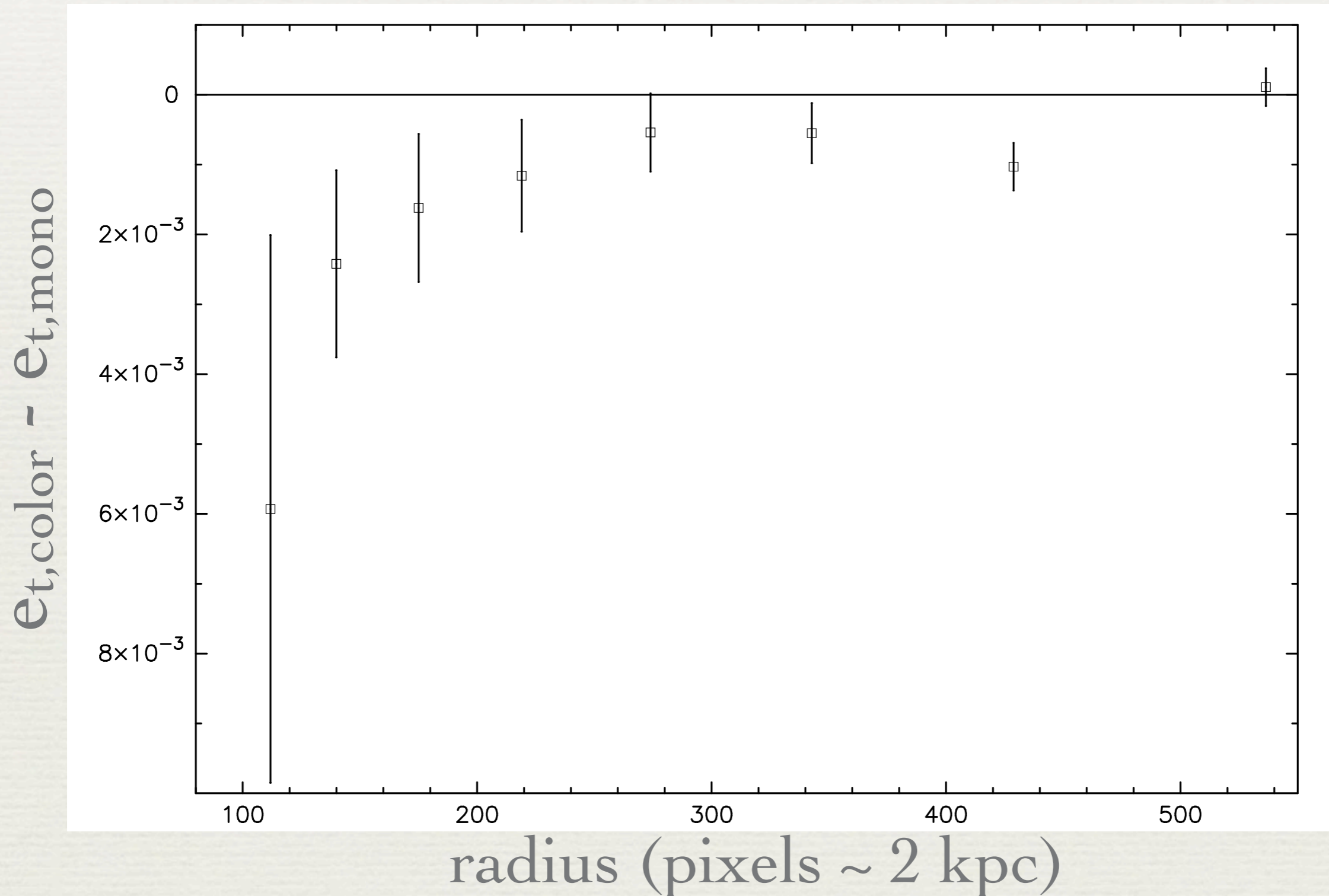




Differential colors across K-band



Galaxy ellipticity change with color added



Current Status

- ✦ Color galaxy simulations samples being verified
- ✦ Using galfit for bulge/disk decomposition to scale separately for more variation
- ✦ Move to Ohio Supercomputing Center in April, create full set (~ 100 normal image sets, ~ 100 with arbitrarily placed emission lines) for release in summer
- ✦ Could really use a filter set to simulate (been using SDT), and an estimate of $n_g(m,r,z)$ for the galaxy population in NIR to $K \sim 27$

Future Work

- ♦ Adding pixel-level effects (charge diffusion, etc) over summer
- ♦ Adding cluster galaxies over summer/fall
- ♦ Replace HST cutouts with pixel-SED models and/or Hydrodynamic galaxies to include effects of emission/absorption lines